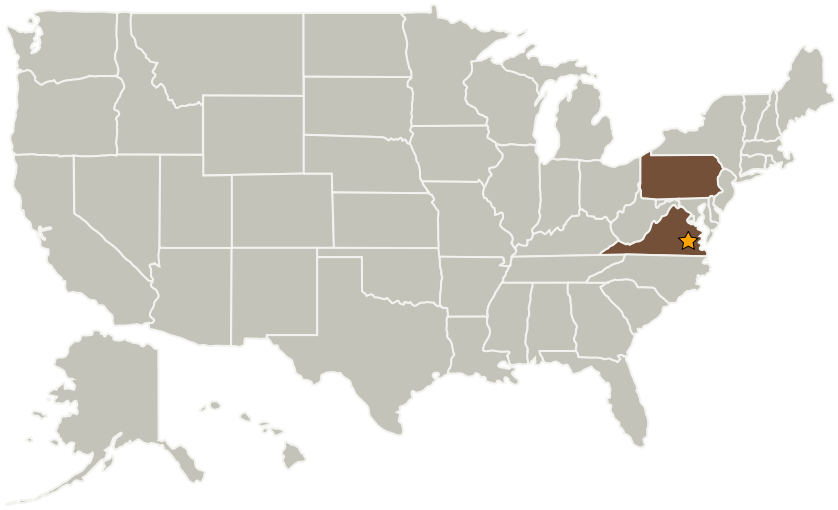
Extreme Environment Damage Index and Accumulation Model for CMC Laminate Fatigue Life Prediction, Phase II

Completed Technology Project (2009 - 2011)

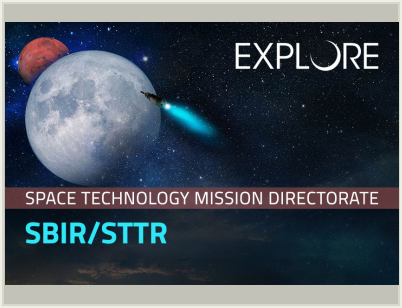
Project Introduction

Materials Research & Design (MR&D) is proposing in the SBIR Phase II an effort to develop a tool for predicting the fatigue life of C/SiC composite laminates, which incorporates mechanical loading at any minimum stress to maximum stress ratio (i.e., R value), at room and elevated temperatures, in either inert or oxidizing environments. The success of this effort would represent a significant state-of-the-art improvement in fatigue projections of ceramic matrix composites, since no tools capable of accomplishing this have ever been developed. The developed algorithm, implemented via user-defined subroutines operating within the ABAQUS public domain finite element software, will represent a significant new addition to the suite tools currently available to CMC designers.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Materials Research and Design, Inc.	Supporting Organization	Industry	Wayne, Pennsylvania



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations	
Pennsylvania	Virginia

Project Transitions

November 2009: Project Start

November 2011: Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.2 Computational Materials